7. Implementation of BIM

7.1 Practicing BIM

Given the ever-present nature of digital information sources and assets *where do you start?* is a very good question. The answer to the *'why'* question should be obvious, because of the sheer volume of data floating around in the electronic ether and the vast amounts of data being collected by various (and nefarious) organizations. When implementing BIM, most often the first question is where to begin. There are two mayor approaches you can choose: bottom-up or top down.
Frankly, if BIM is not practiced in your enterprise then anywhere will do, though the most substantial effects will be achieved if executive sponsorship and support is obtained. If you have a new line of business with undocumented business processes to start with, then you can use this Line of Business (LoB) as a pilot; if you have undocumented business processes throughout your enterprise, use that problem as an opportunity. No matter how small the project, make sure you can demonstrate benefits.

In this chapter we focus on both approaches to kick start you. Whatever approach you choose follow the steps below:
1. Understand the topic at hand, the position in relation to the DID drivers (i.e. where the topic impacts your business model) and the environment of the enterprise and the position in the lifecycle.
2. Think about governance and strategy and necessary business transformation by understanding how your organizational architecture (the operating model of your enterprise) and the consequences for topics and issues to be analyzed in conjunction with other strategic themes and choices.
3. Understand the necessary capabilities and identify business mission fulfilment capabilities
4. Present the business case for your project/plan and make sure a management decision can be made about your proposals
5. Implement the plans for transformation and make sure the developed solution is both permanent and robust in operation.

Each step can be placed in an overall framework that summarizes our earlier chapters (Figure 7.1). For each step, we are supplying checklists of essential questions you need to ask and the information you should gather that will help you to build a solid business case for business transformation, and/or BIM, and how to use DID effectively to assist you.
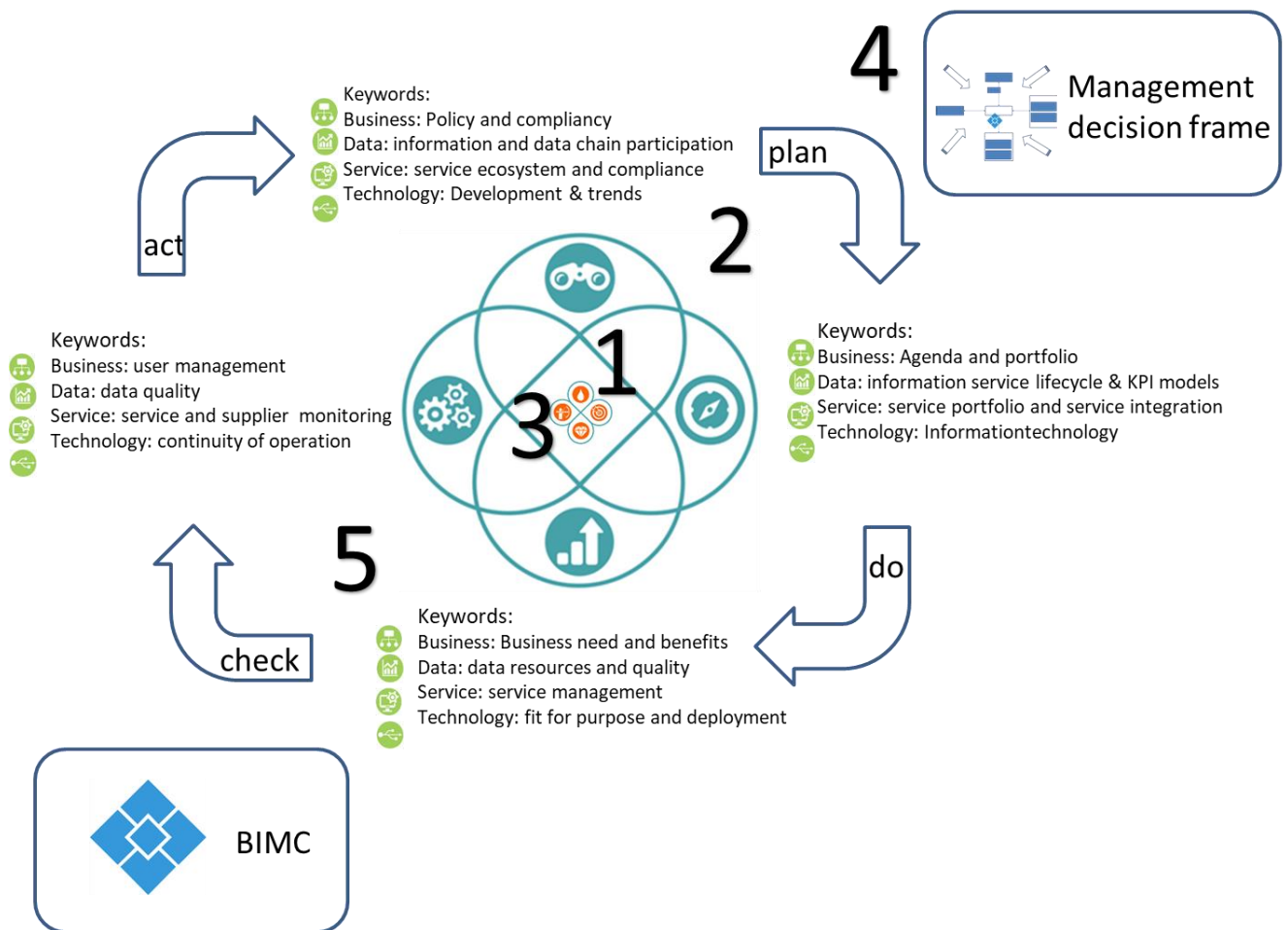
Figure 7.1: Implementing and executing BIM

7.2 Step 1. Understand the business model

7.2.1 Identify your business drivers

Use **Drivers** to identify *your* business drivers and current organizational drivers. Before embarking on establishing BIM (or implementing DID), it is good practice to think about how your enterprise and its business are organized. The questions listed below will help you develop a balanced view.

- What is the business of the enterprise? It might be obvious to you, but are all goals and aspirations clear to everyone, including suppliers and partners?
- What are the strategy and goals for the enterprise/LoB
- Who are our customers and stakeholders?
- Where are the internal customer and supplier boundaries?
- What about external customers, partners and supplier boundaries?
- What about information chain partnerships?
- How, why and when does the business interrelate with other LoB in the enterprise?
- What are our digital assets?
- How well does the enterprise meet its current objectives?
- Can information integrity be relied upon?
- Is BIM a recognized discipline in your enterprise and if so, how is it functionally organized?

- What is the enterprise trying to do better, cheaper or differently, and what are the factors that constrain this?
- What are the relationships with other enterprises, including competitors?
- What information services are provided and for whom?
- What information services are procured and from whom?
- Who else should be consulted?
- What characterizes the culture of the enterprise?
- How are responsibilities organized?
- What are the command structures and reporting chains?
- What styles of management are in use?
- Who has authority and to what degree?
- What freedoms, constraints or political imperatives are there?

7.2.2 Analyzing underlying topics and issues

From a BIM perspective the practitioner should be thinking about the impact of (digital) services, ensuring the focus is on the business processes. Transforming the business begins with the business model and articulation of the desired enterprise services. The elaboration should always begin with thinking about the business model, the enterprise architecture(s), the services and then the operating model.

You can analyze the issue at hand using the DID model. Refer to Figure 7.2, where the 'anchors' have been placed, to give you an idea of the types of key topics in each domain and use the **Perspectives** to gain insight. Keep in mind that we mentioned earlier, you need to distinguish between green and brown field situations or (more likely) hybrid situations and consider how your plans correspond to the **Drivers**.
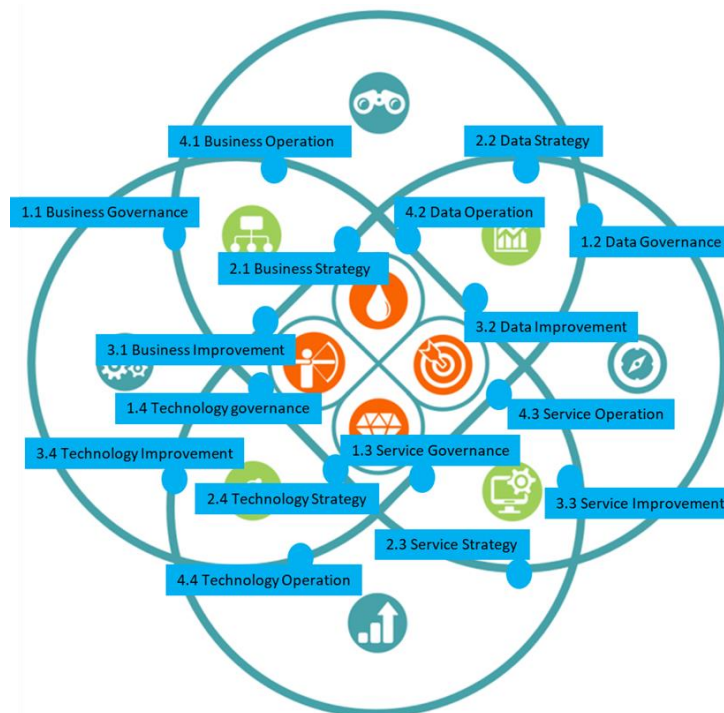

Figure 7.2: Anchors

7.3 Step 2. Governance, strategy and business transformation

The most effective introduction of BIM requires the business case to focus on the scale of the current and future digital environment and how good governance and effective strategy will assist with being clear about the need and value of new or improved digital business services.

7.3.1 Essential questions for your strategy

It is suggested that when addressing the business model, you should initially focus on the following questions:

- How does the enterprise currently determine whether technology support and delivery capabilities accurately match requirements with regard to managing data and information services?
- What challenges does the enterprise face in achieving strategy and goals?
- What are the internal delivery capabilities (processes, competences) required to fully support the enterprise strategic objectives?
- What is the experience you expect users to have when using digital information services and will these match expectations?
- What are the delivery capabilities that are currently provided by suppliers and do they work with both internal and external suppliers?
- Does the enterprise have a plan that accurately describes how your business will function in the near future? In six months? In twelve months? In eighteen months?

Remind yourself that there is not one, single, absolute way to success, use what suits you and your audience. Once you have answers to the questions posed above, or have gained an understanding of the current state of play in your enterprise, you will be in a position to identify the supporting information you will need for a solid business case.

7.3.2 Gather essential supporting information

You can expand your thinking by acquiring information about how success should be measured. Some of the questions you will find are repeated. Look for evidence, not just 'box ticking', a quality policy will usually require documented evidence, but sadly this is not current practice in all situations.

Consider the following points when gathering supporting information:

- How do you arrive at the measurement of business need and value with business information services and information technology solutions in terms that are both quantifiable and meaningful to your executive management? And are they meaningful to users? And partners or suppliers?
- Describe the process and technology used by the IT units to manage the assignment and configuration of information and data assets for specific information services. Is it effective?
- Describe the processes and technologies used to monitor and manage essential commitments made by IT and measure user satisfaction. Are they effective? Are they focused on information services and not on technology?
- How does the enterprise evaluate the success and failures of BIM/IT initiatives? What are the key issues?

- Have you documented an enterprise data architecture for your enterprise? Where are the data about the architecture recorded and how is it made available as appropriate?
- Based on the execution and impact of ongoing projects, how are enterprise data risks identified, classified, recorded, analyzed, documented, managed and communicated?
- What financial approaches are used to fund and track both initial and ongoing investments in information/data programs and projects? Are they effective?

7.3.3 IT planning

In the digital age, information is intrinsically and irrevocably linked to IT; clearly then, you must now take a close look at IT within your enterprise and ask some searching questions. Consider the issue of structured and unstructured data; in many enterprises unstructured data is the major issue and in all enterprises there is evidence that more unstructured data exists than useful structured data. Think also of the 'digital savvy' employees that have created (for whatever reason) their own personal Database(s). Not just that but their own personal downloaded apps that sit on the corporate network.

If parts of the enterprise have pockets or islands of information that is organized or used in some specific fashion in order to meet business needs then it should be corporate and it is a failure of BIM to have no knowledge of the need and the data. Conversely it is also a failure of BIM to recognize the danger inherent in allowing these islands of data to exist if they are not necessary. Did a policy exist regarding keeping data in private repositories? If not, why not? And if it did exist, how was compliance enforced, what went wrong?

- Describe how the enterprise tries to overcome resistance to change and to meet any urgent need for the planning and execution of business opportunities. Does the enterprise examine risky opportunities and take chances to profit?
- Describe the strategies, processes and technologies used by the enterprise to identify improvements and to initiate, assess, approve, assign, deliver and support changes to the user environment. Is change management an enabler of change or a bottleneck?
- Describe the way in which the enterprise initiates, assesses, approves, assigns responsibilities, strategizes and delivers beneficial results from IT-driven and data-driven projects to the users.
- How effective is IT in these areas?

7.3.4 Architectural issues

It may not be all about IT, though as we have continuously emphasized, IT is both a driver of innovation and a legacy that you must deal with because information is delivered electronically. Particular attention should be paid to information service architectural issues. Some of the following points will amplify your thinking about the LoB in the context of IT. And remember, BIM primarily focuses on the data architecture - but a service architecture, and a technical architecture will also exist and so will a business architecture and as BIMC you will need to be aware of all of these.

A few typical 'IT' issues:
- In considering a merger with another enterprise, is it possible to get scale advantages from combining two central IT departments? This is far more than a technology decision.
- At which level of the enterprise should the IT strategy be formulated? What about the data strategy?

- Should the enterprise's information strategy and transformation evolve 'bottom-up', or 'top-down'? Why is one of these approaches considered preferable to another?
- Should the enterprise's information strategy be dictated by the available technology?
- Is your enterprise state-of-the-art or 'state-of-the-ark' (but proven) technology?
- Should you always commit to a supplier that proposes a particular technical solution?
- How do you determine the degree of IT support the enterprise needs to function effectively?
- Do you know how much knowledge of your processes, products, services and customers resides in unstructured and inaccessible files? Can old microfiche records, paper records, CDs, video tapes or eight track cassettes be found, let alone accessed for content?
- If a new way of working will require support from a new or improved information service or system, can you be sure of obtaining one that works? What will you do if it doesn't work?
- How many frameworks and standards are there and who knows what they are and how they fit together?

7.5 Step 3. Identify capabilities needed

The Capabilities discussed in chapter 3 provide you with the important information you need to think about in terms of how the enterprise mission can be addressed. To help you focus on some key features, think about answers to the following questions.

- What major enterprise and departmental polices guide your technology choices? How is Bring your own device or Choose your own device (BYOD or CYOD) implemented and, more importantly, controlled?
- How are new digital information system technologies introduced into the enterprise? How is their impact assessed and managed in the data center and in the field?
- Have you identified a catalogue of standard information/data services? Or a blueprint of how the standard technologies interact with each other and support the digital environment?
- Are you dependent on any one particular partner or supplier for the whole, or any part, of the information services of your enterprise? What about IT infrastructure?
- Have you clearly identified possible transition strategies?
- Make sure everyone understands that there is a difference between a capability and a capabil-**IT**.

7.4 Step 4. Present the business case

Does the enterprise have a process in place to continually examine and determine how to bridge the gap between the anticipated future requirements for information and data, and existing resource capabilities? Can you interpret your business model in a way that focuses on strategy and not only what is operational?
Question to be asked.

- Do you have an information management decision framework in place?
- Is there are controlled process to present initiatives and make decisions?
- Is there a mandate for change?
- Are the appropriate stakeholders present in the steering board for BIM?

- Do we understand existing resource capabilities?
- Do we understand how customers perceive the service, is it needed and valued? Is the experience of using the service good,, bad or merely adequate?
- Do we understand how to explicitly describe future capabilities needed and is it explained in the business case how they relate to the proposal?
- Is it understood how the requirements impact operations?
- How does the business case explain the strategic added value in relation to the four drivers: capability, mission, value and need?
- Does the business case explain the strategic need and also whether proposals are realistic and how actions can be executed?

7.6 Step 5. Secure the transformation

If operational management of BIM is already in place, at this point BIMC switches from a supporting role to an executive role. Activities should be focused on translating the solution into improvement and operations. Questions to be answered.
- Who owns the transformation program? The BIMC unit?

7.6.1 Delegating responsibilities for functional management

Who will be responsible for the following activities?
- Orchestrate the pace and timing of digital transformation and the use of DID.
- Communicate a consistent view of the transformative changes you wish to make; are you focusing on documenting and automating business processes, or on finding an opportunity to introduce BIM or simply to use the DID good practices?
- Create a central point for information exchange.
- Use sensible, non-generic metrics to monitor progress.
- Make sure that executive action focuses on the links between strategy, tactics and operations.
- Provide regular updates for middle managers, using handouts to ensure further dissemination.
- Appoint someone to stay close to the program manager or leading teams, to stay on top of issues and to ensure that no mixed messages are communicated. This could be your services design coordinator role if you have one, or of course the SRO.
- Understand that there is a difference between communicating what is to happen and expecting it to happen.
- Make sure the overall vision is simple and inspiring, but not constricting.
- Consider which specific groups of employees will be implementing improvements or changes and therefore expected to understand the change.
- What new skills will they need?

Case: Data and Information strategy in Government

Background
A government traffic management agency formulated a data and information vision and strategy. They concluded that their directorates and suppliers already held a lot of data,

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but the way it is managed and contained in different systems failed to make providing that information as timely or as useful as it could be. Naturally such conclusions required months of work by expensive consultants interviewing rafts of people who already knew what the problem was, but needed consultants to say the same things or they would be ignored by their Directors.

Many decisions required information from multiple places. It was critical to have a business information model which offered a single view of the types of data that existed and a logical information model which described how the data related. The consequence of the failings were: additional cost, re-work to applications development and delay that crept into almost every part of their business. Levels of frustration resulting from poor data and incompatible systems were high, which impacted their people, their engagement and well-being. Levels of frustration that a bunch of strangers were paid small fortunes to tell them what they already knew were not assessed.

Innovation
Traffic management technology changes very quickly (no, that is not a joke). Which sadist invented the speed camera? Also, the external environment changes at pace, though years of road work is how we know that judging speed as well as time is relative. Digital development and technology advances mean that data is everywhere, and customers can consume information about their traffic management network. The executive board decided that their reputation and the reputation of the department and even their right to exist depended on their ability to provide trusted information and services to the public, by protecting and treating traffic and traffic-related data and information rapidly and ethically every day.

The information vision and strategy created by the department reflected this ambition and captured their excitement about a connected future (they are civil servants, they take excitement where they can get it), enabled by information – that benefits employees, customers, stakeholders, society and the economy.

Vision statement
Our vision is to realize the full value of information by empowering our people, connecting ourselves and building trust with our suppliers, stakeholders and customers. By providing information that can be trusted and valued by all, we can fulfil our purpose of connecting the country through better journeys. The future belongs to the connected. What connects our environment is us. What connects us is the power of information.

We can agree this vision is very brief, then again there is a lot of traffic in the world so a long statement does impart a certain gravitas. In four primary objectives they describe what they hope to achieve:

- Harness the passion of their people to innovate and realize value from information

- Treat information as an asset, and a means of achieving their strategic objectives

- Build advocacy with their suppliers, stakeholders and customers by sharing trusted information

- Use information to shape their future role as a great enterprise.

The board want to have the opportunity to become a data-driven enterprise with the capability to unlock the value of their information assets and enable strategic imperatives. To highlight the size of this opportunity, they looked at how effective information management could support them, their customers and environment. Based on their vision the board formulated ten principles describing why they believe information is critical to success and to guide all their information management activities:

- We will use information as best we can, even if it's not perfect

- We will increase the trust people have in our information by assuring its fitness for purpose

- Information can affect people's lives and we will use it transparently and ethically

- We need to understand how the information we collect is used by others to make sure it is good enough for everyone

- We must continually earn the right to look after our customers data

- Information is a valuable resource that will be kept safe and secure from accidents and attacks

- Looking after information has a cost we should understand and account for

- We all have a responsibility to look after our information so that it is fit for purpose

- Decisions made with information create better outcomes for our customers, stakeholders and ourselves

- The value of information is only realized when it's used to help make decisions

BIMC and the Information strategy
From their vision the board formulated an information strategy that sets out a roadmap and framework of being data driven and how they want to achieve their vision. It describes how their information vision will be achieved to deliver value and realize the best possible return on investment. It also explicitly describes the need for BIM in the work of the enterprise if the intended future state is to be a reality.

As stated in their strategic documents, being data-driven will enable them, their customers and suppliers to make decisions underpinned by a trusted source of truth. Through developing their information management system and investing in data-to-intelligence capabilities, they will enable the strategic outcomes for their enterprise. This change will be delivered through three activities:
- Inspiring a data-driven culture,

- Providing data-to-intelligence services

- and Investing in data-driven capabilities

> Each of these activities will be a BIM (BIMC) responsibility.

7.6.2 Performance

The front line may not be the executive focus, though it is very important that you gather information about how the information services are performing to provide any evidence about the need for BIM.

- Does the IT supplier or unit have the infrastructure and performance instruments in place to accurately determine how the enterprise is currently functioning with regard to digital information service use, quality and need for improvement?
- What methods are practiced by the information service developers to ensure that the processes of design and delivery are continually improved? Is Agile a buzz word or a way of thinking? Are communications effective?
- Describe the means used by management of the enterprise to discuss and develop objectives, provide required resources and organize work.
- Describe the enterprise process of dealing with user incidents, requests and problems in terms of the initial identification of issues, escalations, assignments, scheduling, time tracking, entitlements, ongoing information and knowledge collation, and resolution. Is the process 'ITIL-like' or 'ITIL-compliant'? The former generally implies a thoughtful approach, the latter a reliance on an expensive consultant model that may or may not add value and which is likely to focus on infrastructure issues.

The key to formulating strategy is not having a model of procedures, it is being aware that the combined brain power of a group of individuals needs to be focused on sensible, measurable goals and benefits that improve the business. The approach shown is valid for any strategic brainstorm. After all is BIM so special that it should have a unique strategic thought process? Think before acting and eliminate risk where possible before spending money; mistakes are more expensive to correct as time passes.

7.6.3 Compliance with policy, strategy and performance

- Can you identify the parts of the enterprise data architecture that are critical to your information services? Do you know which parts of the architecture represent risks (potential bottlenecks, capacity chokepoints, single points of failure, etc.) to the efficient operation of your information services?
- What communications and formal agreements are put in place to set the coordination for technology infrastructure and project architecture programs? Are the agreements contractual or legally binding? If so, how have they been working?
- Do the sourcing and procurement organizations in your enterprise get involved with making technology choices? How do they help?
- Is any group responsible for enforcement of the (various) architectures? Communicating the architectures? Guiding other groups in understanding and using the architectures?
- How do you manage technology decision-making?
- How do you determine the priority and impact of IT-driven project requests? Do you operate a planning unit, program or project office? How effective are they?
- What cost components are important to you in defining the value of your significant information services and your supporting technology infrastructure?

> Case: Article 17 GDPR 'The Right to Erasure (to be Forgotten)[19] ' User request
>
> Introduction:
>
> A university receives a request from a former student based on Art. 17 of GDPR: Right to erasure). Since this particular university was born out of several other universities, the amalgamated body has not designed processes to fulfil such requests and as the data protection officer is in charge of all GDPR-related requests, as is common, will ask IT to remove the related data.
>
> The issues
> The first question is: Where is all the information about this student that needs to be removed and the second, how do we recognise information that should not be removed?. And if you think you have an answer, consider the local use by the student of excel sheets, marketing applications with their own data and so on. What information did this student interact with, where is/was it stored, is it archived, who else was the student in contact with……
>
> BIM
> The main concern relates to who REALLY knows what to do. This is why BIM should be in charge. DID has specific references to ensuring that BIM understands the holistic use of data across the entire IT infrastructure as well as in the business. Key to that understanding is being involved at all stages of the design of application services and use of applications.

7.6.4 Quality and efficiency

A QMS dictates that documentary evidence is available and that such evidence (data if you like) can be audited. Whatever the answers you may have unearthed in gathering evidence, this now needs to be documented to cement a quality-driven approach:

- Have you documented the enterprise data architecture? Does it correctly (and succinctly) describe the information services, systems, data, and applications aspects of your information services?
- How is the information services data architecture implemented in your enterprise? Is the architecture dictated by legacy services? Are there guidelines and procedures that guide the implementation?
- Are your data designers and architects sufficiently experienced and trained?
- Who has ownership of the current data architecture management process and who is responsible for implementing the architecture?
- What do you do to ensure that technology choices are consistent?
- Does every IT unit in the enterprise follow the standards and guidelines of the enterprise data architecture?
- How is information regarding problems and/or work requests analyzed and fed back to improve the technology or applications infrastructure?

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[19] https://gdpr.eu/right-to-be-forgotten/

7.7 Don't give up

These words were sung by Peter Gabriel and Kate Bush, but there again they had loads of money and could afford to sing in clichés. That said, it is in fact true that persistence is needed to ensure a rigorous approach to BIM. Of course, the lists of questions cannot be definitive, though armed with these as a guide and amplified with the answers to many of the other questions we have identified throughout this book (and the DID Foundation book), you will be in good shape to prepare a business case that provides evidence of the need for BIM in your enterprise.

But what happens if you cannot engage executive interest? Identify an information service that is valuable, needed but unfit for purpose and dissect the service components. First, think about the information service in terms of the four domains, identifying how good Governance should be applied or better Strategic design, or perhaps simply Improvement. Identify the key (and expensive) Operation issues. Be flexible in your thinking.

Consider the service from all stakeholder perspectives to assess where improvements will be justified, cost effective and demonstrable. Then consider the drivers we have identified and sketch out how you can use these drivers to identify KPIs and CSFs for an improved service.

Calculate the costs of having to maintain the inadequate service and the impact of the service on the business. Then calculate the costs of improvement, and the money that will be saved through having a service that is not causing problems. Maintenance costs over the life of an information service far outstrip the cost of development.
You can demonstrate the improvement value for one business information service in this way; extrapolating these results into the likely outcomes of improving other information services should be an effective way to gain interest!

Setting up and operating BIM governance and BIMC is a change process that has far-reaching consequences for the employees. In order to improve the chances of successful implementation at an early stage, it is necessary to include them in the thinking and development process for the design (and functioning) of a BIM function that fits in with that of the enterprise. This can also mean that a different 'language' is created that fits better with one's own culture and discipline.

The road to fully realized BIM is characterized by behavior rooted in experience where it develops from reactive, through active, to proactive mode. But this development process is not linear. It is the route from 'good' to 'better' that makes the added value of BIM visible, it is not a targeted pursuit of a final phase in the development.

John Kay (who knew Steppenwolf lyrics would cover such arcane management theories………) describes this as 'obliquity'[20]; it (in this case 'it' is BIM….) is not the goal but the route to it that matters. And in general, this route is not a straight line. That is why we also state that, apart from the trajectory that it is developing, BIMC must strive to move from reactive, through active, to proactive behavior. This can only be reached if BIMC staff has sufficient time to gain experience.

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[20] Kay, J., (2011), Obliquity, Why our goals are best achieved indirectly, Profile Books.

Risks will manifest themselves differently in each enterprise, however all risks must be mitigated in a timely fashion. Various risks have been identified in the previous chapters. We list a few of the more important risks below:

- Too much focus on delivery and demand bundling and too little on users, customer satisfaction and governance.
- Too little capacity for planning and/or competence within BIMC.
- Too little sponsorship from higher management.
- Not taking the time to grow and gain experience.
- Forgetting to look back. Are the assumptions we have with regard to design and development still legitimate?
- Not enough visibility of the added value of BIMC.
- Failing to recognize when 'Good is good enough'; knowledge of the market means insight into the range and suitability for one's own objectives and needs.
- Insufficient insight into the project portfolio and costs.
- Too little interest in opportunities for cost savings, innovation and improvement.
- The lack of adequate risk management.

Often BIM is seen as being 'Something done by IT' (a capabil-**IT**) rather than being a management function that the enterprise depends upon to ensure the integrity of the information used to transact business effectively and appropriately. And business transformation often focuses on the operating model and not on the enterprise architecture, meaning that there is a gap between business and IT understanding. DID will help you to focus on innovation for the business by structuring the process of thinking about new services and will assist you in maintaining the integrity of the business data/information perspective.

This concludes part 1 of this book. If you have been sufficiently inspired by now, read on. If not, have a drink and try again. In part 2 we show several examples how introduce BIM or to improve BIM using DID guidance. So, have a drink anyway.

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Key Points

When implementing BIM, most often the first question is where to begin. There are two sensible approaches you can choose: bottom-up or top down.
Basically you cover 5 steps

1. Step 1. Understand the business model : Understand the topic at hand, the position in relation to the DID drivers (i.e. where the topic impacts your business model) and the environment of the enterprise and the position in the lifecycle.
2. Step 2. Governance, strategy and business transformation: Think about governance and strategy and necessary business transformation by understanding how your organizational architecture (the operating model of your enterprise) and the consequences for topics and issues to be analyzed in conjunction with other strategic themes and choices.
3. Step 3. Identify capabilities needed: Understand the necessary capabilities and identify business mission fulfilment capabilities
4. Step 4. Present the business case: Present the business case for your project/plan and make sure a management decision can be made about your proposals
5. Step 5. Secure the transformation: Implement the plans for transformation and make sure the developed solution is both permanent and robust in operation.

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